The information in this booklet is designed to help you understand more about articular surface replacement of the hip joint and total hip replacement. It is only intended to be a general guide and there will be variations from one hospital to another. It is therefore important that you discuss everything with your doctor.
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The aims of articular surface replacement

The modern day patient is getting younger and more demanding. There is a premium on quality of life with a desire and need to rapidly return to normal activities.

Maximised Implant Survivorship

Optimised Function
The patients are looking for an implant that will allow them full function and let them perform their daily routine activities, without any concern. The modern day patient is looking for optimised function.

Patients approaching joint replacement want to feel confident that their implant will last as long as possible.

The success of such a procedure relies on the use of:

**High performance Bearings (Articulation between ball and socket)**

**Clinically reliable implants**
Anatomy of the hip joint

The hip joint is a ‘ball and socket’ joint. The hip joint allows movement to occur between the thigh bone (Femur), and the hip bone (Pelvis). The pelvis contains the ‘socket’ called the acetabulum. The ball shaped head of the femur fits into the acetabulum, forming a ball and socket joint that enables the leg to have a wide range of movements.

The outer surface of the femoral head and the inside surface of the acetabulum are covered with cartilage. The cartilage surface is a tough and very smooth material that allows the two surfaces to slide against one another with ease during movement.

Envelopes of tough ligaments connect the pelvis and femur, covering the joint and stabilising it. The hip joints’ movements are initiated and controlled by the thick muscles of the buttock at the back and the thick muscles of the thigh at the front.

A healthy hip joint allows the leg to move freely within its range of motion, while supporting the upper body and absorbing the impact that results from activities such as walking and running.

An articular surface replacement aims at restoring this normal biomechanical relationship and so enable normal function of the hip after articular surface replacement and once the muscles are back to normal strength.
There are a number of conditions that can result in a patient having to undergo an articular surface replacement surgery. Perhaps the most common condition is osteoarthritis that is commonly referred to as ‘wear and tear arthritis’. Osteoarthritis can occur with no previous history of injury to the hip joint. The hip simply ‘wears out’. There may be a genetic tendency in some people that increases their chances of developing osteoarthritis.

- **Osteoarthritis** is a chronic joint disease characterised pathologically by degeneration of articular cartilage and hypertrophy of bone, clinically by pain on activity, which subsides with rest. Also known as degenerative arthritis, hypertrophic arthritis and senescent arthritis.

- **Rheumatoid Arthritis** is a chronic inflammatory disease that results in joint pain, swelling and stiffness. The process of this disease tends to lead to severe deterioration of multiple joints, resulting in loss of function and severe pain.

- **Avascular Necrosis** is another condition that could lead to articular surface replacement surgery. In this condition, the femoral head (ball) loses a portion of its blood supply and actually dies.

- **Developmental Dysplasia of the Hip (DDH)** is a congenital (present at birth) condition of the hip joint. It occurs once in every 1,000 births. The hip joint is created as a ball and socket joint. In DDH, the hip socket may be shallow, letting the “ball” of the thigh bone slip in and out of the socket. The “ball” may move partially or completely out of the hip socket.
• **Slipped Upper Femoral Epiphysis** is a condition involving the upper end of the femur (thigh bone), where the epiphyseal plate (growth plate) is weakened and the head of the femur (ball) is slipped downward and backward.

**Total hip replacement**

In the 1960’s, Sir John Charnley pioneered the development of total hip replacement technology. His prosthesis involved a plastic acetabular socket with a metal femoral stem.

**Bearings**

The points where the moving parts of a hip replacement connect are referred to as a bearing. Surgeons will choose a bearing combination that best meets the needs of the individual patient.

Possible bearing materials are metals, ceramics and plastics. The bearing surface plays a critical role in the success and durability of the implant over time. With advancements in technology and manufacturing these bearing materials have become very reliable as well as being capable of producing low wear.
Hip resurfacing

The history

Hip resurfacing has always made intuitive sense and different types of prosthesis made from a variety of materials have been tested since early 1920’s. Modern hip resurfacing was first developed in the 1970’s. The early implants were manufactured with metal bearing on thin polyethylene, which experienced a high rate of failure.

The failure was attributed to using the wrong material as well as early loosening due to poor manufacturing tolerances between the bearing surfaces.

Resurfacing made a comeback in the early 1990’s by changing the material and using Metal-on-Metal bearings. The results have been far more positive since manufacturers’ understanding of the materials has also improved.
The advantages

The advantages of articular surface replacement include reduced dislocation, restoration of “normal anatomy”, anatomical loading of the hip joint and preservation of the patient’s natural bone.

There is a benefit from increased range in motion and superior restoration of joint function compared to conventional hip replacement.

By utilising the advances in Metal-on-Metal technology the resurfacing procedure offers patients a very durable and long lasting implant that is well suited for higher demand activities and lifestyles.
The risks

The risks associated with a resurfacing procedure are similar to a total hip replacement. In addition a resurfacing replacement may fail due to femoral neck fracture or softening of the bone (avascular necrosis). A revision procedure for a resurfacing implant is relatively simple as the head can be removed and it can be converted to a total hip, similar to a primary total hip procedure.

The procedure

Articular surface replacement is similar to a traditional total hip replacement from a surgical perspective. In a resurfacing procedure the femoral head (ball) is not removed but with the use of specially designed instruments the femoral head is precisely reshaped to receive the component.

The reshaped head is fitted with a hollow metal ball, which is cemented on. The acetabulum (socket) is prepared in a similar fashion for both a traditional total hip replacement and resurfacing with a metal shell being firmly fitted into the acetabular bone. The bone will then grow into the shell to hold it in place.
What if I am not suitable for articular surface replacement?

You may not be suitable for the procedure if you suffer from:

**Osteoporosis**

**Physiologically over 65**

**Patients on steroids**

For some patients articular surface replacement may not be suitable, so another option may be the combination of an advanced bearing with a conventional femoral stem. The decision depends on the patient’s bone quality and joint anatomy, which will be reviewed by the surgeon during a pre-operative and an intra-operative assessment.
Components of an articular surface replacement

Each hip joint is made up of several parts:

1. The acetabular component or cup or shell replaces the acetabular bearing surface. The acetabular component is made of metal alloy with a highly polished internal surface.

2. The femoral component replaces the surface of the femoral head. The femoral component is a single component made of metal alloy with a highly polished bearing surface.
Preparing yourself for surgery

Articular surface replacement has been a reliable alternative to total hip replacement (1,2).

As with all surgery, there are a number of things which the hospital will ask you to do to ensure the operation is a success. If you have any questions or concerns, ask your doctor or hospital staff.

The next sections explain what you will be asked to do before you go into hospital, during your hospital stay and when at home recovering.
Before you go into hospital

There are several things that you can do before your surgery to make your recovery easier and safer.

Commit to the success of your surgery

Working as a team, you, your physician, physiotherapist and your family must adopt a positive attitude toward the success of your surgery. Together, you will gain a clear understanding of the common goals and expectations of the procedure.

Remain as active as possible

Remaining active while waiting for your surgery is an important key to the success of your surgery. Studies have shown that the stronger and more flexible you are before your operation the quicker you will recover and more flexible you will be after the operation. Gentle exercise such as walking, range of motion exercises and swimming can help you to stay strong and flexible. Seek your doctor’s advice before beginning any exercise.

Stop smoking

If you have not already done so, it is suggested that you stop smoking at least four weeks before your surgery. This will help reduce the risk of complications during and after your surgery.

Make sure all infections are cleared up prior to the surgery

These include: tooth abscesses, bladder infections, infections such as leg ulcers, colds and the flu. This is because infections could spread through your body during the operation and infect your new replaced joint. Therefore you must tell your surgeon immediately if you suspect you have an infection, as your surgery may have to be rescheduled. You may also wish to consider how you will cope after the operation, for example, you may need help getting home, shopping, etc. Do discuss this with your doctor or a hospital staff member.
The operation

Step 1: After making the incision the hip joint is exposed.

Step 2: Your surgeon will move the femoral head out of the acetabulum. This is so that the hip joint can be clearly seen and allow your surgeon complete access.
Step 3: The damaged surfaces of the femoral head and acetabulum are then removed and the underlying bone prepared to accept the artificial hip components.

Step 4: The femoral (ball) and acetabulum (socket) components are then fixed to each respective bone.
Step 5: Once all the components of the articular surface replacement are in place, your surgeon will put the femoral head back into the acetabulum and check that the movements are full, smooth and stable.
Your hospital stay

When arriving at the hospital, your anesthetist will examine you. This is an opportunity for you to ask any questions before your operation. On the day of your operation, it is usual that your doctor will ask you not to drink or eat anything. The area around your hip may be shaved to reduce the risk of infection. An hour or so before the operation you may be given tablets or an injection to relax you. This is known as a ‘pre-med’. You will then be taken into the operating theatre where you will be given either a general anesthetic or an epidural (injection in the lower back that stops pain in the lower part of the body) to have your operation. The operation usually takes 1-2 hours to complete.

Immediately after your operation you will be moved to the recovery room for close monitoring. You may have one or two drips in your arm to put fluid back into your body. When you wake up from surgery, your leg may be swollen and bruised and the muscles may be stiff and sore. Your new joint should not cause you any discomfort, but you may experience some pain from the surgical procedure itself. You will be given pain medications to take regularly whilst you are recovering.

When you are fully conscious, breathing well and your blood pressure and pulse are stable, you will be taken back to your ward. You may not feel like eating much at first, but it is important that you drink. The scar on the side of the hip should eventually fade to a thin white line.

Day 1: Mobilise with physiotherapy and a frame

Day 2/3: Mobilise with physiotherapy and independently with elbow crutches

Day 3/4: Mobilise with physiotherapy and independently with walking sticks

Day 4-6: Home
At home recovering

Follow your surgeon’s advice on normal hip precautions for 6 weeks post operation to allow the soft tissues and muscles to heal.

After 6 weeks:

No restrictions. You may return to normal activity and function. Your pre-operation activity level will in part determine the return to full function.

You may return to:

• Driving
• Work
• Sports
• A normal sex life

You have every reason to expect to regain full use of your leg. However this will take time. You should be able to return to normal activities again within a few months of the operation.

These may include driving, gardening and playing golf, but check with your doctor first. There will be a continual improvement throughout the first 12 months. Once the operation has fully healed, many people can’t tell they have an artificial joint.

Upon returning home you will need help for the first few weeks. You will need to continue taking your regular medications and continue exercising as directed by your physiotherapist and surgeon. Remaining active and practicing the prescribed exercises are the quickest ways to full recovery.
Exercises and joint protection

Why exercise?

• Promotes a sense of well-being
• Encourages self-management
• Leads to an earlier recovery

Direct benefits of exercise

• Muscles act as shock absorbers and help to stabilise the joint
• Strengthening muscles around the joint will help protect it and prevent further strain
• Stretching tight muscles across the joint will improve mobility
• Reduces pain
• Improves ability to do daily tasks
• Improves joint nutrition and lubrication at the hip joint

Indirect benefits of exercise

• Improves heart and lung function
• Improves sense of well-being
• Helps to control body weight

Types of exercise

• Range of motion exercises
• Stretching exercises
• Resisted or strengthening exercises
• Endurance or aerobic exercises
Exercise guidelines

- Your physiotherapist should give you an exercise programme
- Start at a comfortable level, 5 - 10 repetitions, 2-3 times a day
- Progress your exercise gradually, exercise until you start to feel tired
- Reduce your exercises by half if you experienced exercise-induced pain for more than 2 hours after exercise
- Stop the exercises completely if they continue to increase your pain
- Do not exercise a painful, inflamed joint but joint motion should be maintained
- To train endurance, aerobic exercises should be carried out 20-30 minutes, 3 to 4 times a week

Muscles to stretch and strengthen

- Buttock muscles (Gluteus Maximus and medius)
- Thigh muscles (Quadriceps and hamstrings)
- Calf muscles (Gastrocnemius and soleus)
NICE guidelines

The National Institute for Clinical Excellence (NICE) is a part of the British National Health Service (NHS). It produces guidance for both the NHS and patients on medicines, medical equipment, diagnostic tests and clinical and surgical procedures and where they should be used.

NICE has issued guidance on metal-on-metal hip resurfacing arthroplasty (No 44). The main points of this guidance are:

- Artificial hip joints can be fitted to relieve the pain and disability associated with hip joint disease, including osteoarthritis and rheumatoid arthritis of the hip.

- Metal-on-Metal hip resurfacing arthroplasty should be performed only by surgeons who have received training specifically in this technique.

- Metal-on-Metal hip resurfacing is recommended as an option for people with advanced hip disease who would otherwise receive a conventional primary THR and are likely to live longer than the device is likely to last.

NICE Guidance can be obtained from their website: http://www.nice.org.uk
References


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